WE CLAIM:

1. A method for identifying candidate cancer-specific or cancer-associated antigens, said method comprising the steps of:

(a) obtaining the amino acid sequences of the extracellular domain of a receptor or receptor-like molecule;

(b) mapping hydrophilic regions of the domain by analyzing the amino acid sequence of the domain employing the rolling sum analysis of 7 consecutive residues;

(c) identifying the hydrophilic peptide regions of step (b) that are glycosylated in non-cancerous (normal) cells, but are deglycosylated in cancer cells;

(d) locating amino acids that are susceptible to modification in the absence of steric hinderance by glycoside chains;

(e) synthesizing candidate peptides that fit the criteria of steps (a) to (d);

(f) labeling the peptides at either end of their amino acid sequence; and

(g) testing whether the candidate peptides are cancer-specific or cancer associated.

2. A cancer-specific or highly cancer-associated peptide comprising the following structure:

(a) an amino acid sequence of a length from 3 - 1000 amino acids;

(b) a net hydrophilic character; and

(c) at least one glycosylatable amino acid located at a position in the amino acid sequence no further than 3 amino acids away from the amino acid adjacent to either end of the peptide, wherein for cells with normal growth patterns the amino acid is the site of glycosylation, but in cancer cells the site is missing entirely, so that the glycosylation site confers a cancer-specific or highly cancer-associated immunogenicity or marker function to the peptide.

3. The peptide of claim 2 further defined as immunogenic.

4. The peptide of claim 2, wherein the glycosylatable amino acid is asparagine.

5. The peptide of claim 2, further comprising a plurality of deglycosylated amino acids, and wherein each deglycosylated amino acid is separated from the deglycosylated amino acid nearest to it by no more than 6 unmodified amino acids.

6. The peptide of claim 5 further comprising:

(a) a chemical modification of at least one of the deglycosylated amino acids wherein the chemical modification confers upon the peptide an additional cancer-specific or highly cancer-associated immunogenicity than that due to glycosylation; and

(b) an amino acid sequence wherein no more than 3 unmodified amino acids are located on either side of a modified amino acid or amino acid that has a glycosylation site removed.

7. The peptide of claim 6, wherein the chemical modification is phosphorylation.

8. The peptide of claim 2, wherein the peptide is produced synthetically.

9. The peptide of claim 2, produced by the method of claim 1.

10. A composition comprising a peptide of claim 2.

11. An immunogenic composition capable of inducing a mammal to produce antibodies specific for an epitope on a cancer cell, wherein the immunogenic composition comprises a peptide of claim 2.

12. An immunoassay comprising:

(a) obtaining the peptide of claim 2; and

(b) determining whether the peptide has complexed with an antibody in the biological fluids.

13. A diagnostic method wherein a plurality of the peptide of claim 2 are placed in a microchip to detect cancer in a subject from which a biological sample is obtained, and cancer is detected by hybridization of antibodies in the biologic sample to a peptide a plurality of peptides in the microchip detected.

14. A molecule which is specifically reactive with a peptide of claim 2.

15. The molecule of claim 14, selected from the group consisting of monoclonal antibodies or immunogenic fragments thereof, recombinant proteins and adhesion proteins.

16. A method of delivering cancer cell molecules containing epitopes expressed by the peptides of claim 2 for the purpose of identifying cancer status, said method comprising an immunoassay for the complexing of cancer cell molecules with a molecule of claim 14.

17. A method of determining degree of cancer expression, said method comprising an immunoassay for the complexing of cancer cell molecules with a molecule of claim 14 or by measuring antibody using the method of claim 12.

18. A method of determining type of cancer cells in a biological sample, said method comprising the complexing of cancer cell molecules with a molecule of claim 14.

19. A cancer imaging reagent comprising a molecule of claim 14 and a label.

20. The cancer imaging reagent of claim 19, wherein the label is radioisotopic and, upon binding to cancer cells cancerous lesion, highlights the presence of the cancer cells when scanned with a nuclear medicine scanner.

21. The cancer imaging reagent of claim 19, wherein the label is a paramagnetic label which, upon binding to cancer cells highlights the presence of the cancer cells when scanned with a nuclear magnetic resonance (NMR) scanner.

22. The cancer imaging reagent of claim 19, wherein the label comprises a water density label which, upon binding to cancer cells highlights the presence of the cancer cells when scanned with a CAT scanner.

23. Cancer therapeutic reagents developed using a molecule of claim 14, said reagents having the following characteristics:

(a) bind to a cancer cell and promote lysis of that cell;

(b) bind to and block the function of a receptor or receptor-like molecule or adhesion molecule on a cancer cell, thereby promoting a reduction or cessation of cancer cell growth, a reduction or cessation of cancer cell migration or promoting cancer cell death;

(c) carry a radioisotope or a toxin which upon binding to a cancer cell damages or promotes cancer cell death.

24. A therapeutic construct comprising a peptide of claim 2 and

(a) adjuvant/peptide conjugates comprising the peptide coupled to molecule which facilitates enhanced immunogenicity;

(b) neomolecules created by recombinant techniques containing a peptide with adjuvant molecular sequences which promote increased immunogenicity of the peptide of claim 2; and

25. A therapeutic construct comprising a nucleic acid molecules comprising a nucleotide sequence that encodes a peptide of claim 2, said nucleic acid molecule being administered to the cells of an individual and then expressed by the individual's cells as a protein or peptide for the purpose of auto-stimulation of the individual's immune system.

26. A method of producing immunity to cancer comprising obtaining and administering an effective amount the construct of claim 25 to a mammal.

27. The peptide of claim 2 having a sequence selected from the group consisting of:

uNu
uNuu
Nuuu
uNuuu
uuNuu
uuNuuu
uuuNuuu
uNuMuuu
uuNuMuuu
uuuNuMuuu
uuuNMMuuu
uuuNuMMuuu
uuuNMMMuuu
uNuuMuu
uNuuMuuu
uuNuuMuuu
uuuNuuMuuu
uuNuuMuuNuu
uuuNuuMuuNuuu
uuuMuuNuuMuuu
[uuNuuN]*n*
[uuuNuuuN]n
[uuuNuuuuN]*n*
[uuuNuuuuuN]*n*
[uuuNuuuuuN]*n*
[uuuNuuuuuuN]*n*
[uuuNuuuuuuNu]*n*
[uuuNuuuuuuNuu]*n*
[uuuNuuuuuuNuuu]*n*
[uuMuuN]*n*

wherein u is an unmodified amino acid, N is a deglycosylated amino acid, and M is a modified amino acid.